BACKGROUND OF INVENTION

Disc sanders are commonly known machines used in the picture framing , woodworking , cabinetry and other industries . Disc sanders are normally used with their discs operating in a vertical plane & their guide plates affixed to the sanders in a horizontal plane approximately at the centerline of the rotating disc , exposing only the upper area of the disc for use . In some versions , the area below the guide plate is enclosed around the disc and having a vacuum attachment while others have no enclosure and simply drop the residue on the floor . Most motorized sanders operate at a high rotational speed , approximately 1750 RPM , which is not desirable for sanding off minor amounts or delicate pieces . Manual sanders normally do not have vacuum attachments and are tiresome to use . When sanding mitered angles of a picture frame molding for example ; the back surface would be set against the horizontal guide surface with the outter surface of the moulding against a 45 degree , or other angle , guide allowing the mitered end to contact the disc . The sanding disc rotates in a direction to always sand towards the upper surface of the moulding so as not to create burrs on the top surface of the moulding . To sand the opposite end of the moulding piece , the outside surface guide will need to be slid or pivoted to form the opposite angle positioning . The moving or re-positioning of guides while performing a precision operation can be detramental to performance & is time consuming .

In the sanders so far described only one quadrant , or ¼ , of the total disc surface can be utilized at one time . Accordingly , this invention , by incorporating a horizontal sanding disc and a vertical (2) two sided guide plate with fixed 45 degree angle rows of guide pins on both sides , allows the sanding of the opposite ends of (2) two moulding pieces at the same time . This configuration also allows usage of (2) two quadrants (¼ + ¼) of the entire sanding disc area . One quadrant (up to ¼) of the disc area is used for operation of the vacuum plate . The configuration of the disc , in cooperation with its bearings and mounting plate , allows for adjustment of the disc axis to align it with the 45 degree guide pins and the vertical guide plate .

Brief Descrition of Drawings

Fig 1 Is a prospective view of the machine from the rear & left side so as to show the greater amount of features .

Fig 2 Is a plan view of the machine showing the base , the circular sanding disc , the pivotable drive motor , the vertical guide plate & the vacuum plate .

Fig 3 Is a frontal view along line **3-3** showing the base , the vertical guide plate , the pivotable drive motor with mounting bracket , and the mounting feet .

Fig 4 Is a right side end view along line **4-4** showing the base with rubber feet , the vertical guide plate with guide pins & mitered moulding , shown in phantom , in allignment with guide pins .

Fig 5 Is a left side view along line **5-5** showing the base with mounting feet , the vertical guide plate with pins & mitered moulding , shown in phantom , in allignment with guide pins , and the pivotable motor & mounting bracket

Fig 6 Is a bottom view along line **6-6** showing the underside of the machine base, the circular disc with it's supporting crossbar mounting plate, the motor drive pulley, the drive belt , the circular disc allignment screws , and the locking screws .

Fig 7 Is a sectional view along line **7-7** showing the base, the vertical guide plate, the cirular sanding plate with support plate , the riser blocks , the bearing plate , bearings & other components .

Fig 8 Is an enlarged setional view along line **8-8** showing the circular disc with bearings , support plate , allignment & locking screws , and other components .

Fig 9 Is an enlarged fragmented sectional view along line **9-9** showing the the base , vertical guide plate , riser block , circular disc , cross bar mounting plate, vacuum plate , base end cap with attachment screws , and mounting feet .

Fig 10 Is a sectional view along line **10-10** showing the base , vertical guide plate, vacuum plate , pivotable drive motor , drive pulley , v-belt , and other components .

Brief Description of Drawings (continued)

Fig **11** Is a fragmented sectional view along line **11-11** showing the disc and vacuum plate .

Fig **12** Is an end view along line **4-4** showing the multi-angled guide in use on the left hand side of the machine set up for the moulding of an eight sided frame .

Fig **13** Is an end view along line **5-5** showing the multi-angled guide in use on the right hand side of the machine .

Fig **14** Is a fragmented top view along line **14-14** showing the multi-angle guide and pins in cooperation with vertical guide plate .

Fig **15** Is a plan view of a multi-angle guide plate

Fig **16** Is a side view along line **16-16** of a multi-angle guide plate

DETAIL DESCRIPTION OF DRAWINGS

Turning to Fig **1** through **5** what is shown is a sanding machne comprised of a formed sheet metal base **1** with formed sheet metal end caps **2 & 3** attached to base **1** by screws **18** . A motor mounting plate **22** is attached to the base **1** by means of screws **37** . A pivotable motor **21**with cord & plug **33** is mounted to the motor plate **22** by means of bolt **17** and nut **23** . The pivoting of the motor **21** , or tensioning , is accomplished by adjusting the screw **15** threaded through mounting plate **22** and contacting the motor base plate . When correct belt **27** tension is accomplished , the jam nut **14** is locked against mounting plate **22** .

A vacuum plate **11** with a cylindrical flange for attaching a vacuum hose **13** is mounted on the upper surface of the base **1** and attached by means of screw **12** passing through the base **1** & threading into riser block **35** (also shown in Fig **11**). Mounted to the top surface of the base **1** is vertical guide plate **5** with the cooperating horizontal guide pins **7 , 8 , 9 & 10** positioned so as to create an essentially 45 degree angle to the top surface of base **1** . Pins **7 & 8** create a locating line on the right side of the vertical plate **5** for the outside surface of a picture frame moulding **B** (and the like) , while the right side of the vertical plate **5** serves as a locating surface for the bottom surface of moulding **B** , pins **9 & 10** corespondingly create the same function on the left side of vertical guide plate **5** for moulding **A** . Horizontally located , slightly below the bottom surface of the vertical guide plate **5** and the top surface of base **1** , is a circular disc **4** with a sanding pad **6** adhered to its top surface . A clearance hole **19** in the top surface of base **1** allows access to the pad **6** for mouldings **A & B** .

Turning to Fig **6** through **10** the disc **4** has a groove on its outter perimeter to accept a V-shaped , or the like , drive belt **27** cooperating with a smaller drive pulley **26** attached to shaft **41** of drive motor **21** by means of screw **25** . The larger diameter of the V-belt driven disc **4** allows for a speed reduction between the motor driven pulley **26** to approximately 220 disc **4** RPM thus providing a more desirable working speed for delicate sanding . At the center of disc **4** is a hole **65** for acceptance of bearing **40** and a counterbored clearance hole **66** for acceptance of a bearing snap ring (or bearing shoulder) **43** that seats on the surface **67** to establish a predetermined depth location for bearing **40** . Engaging the lower surface of disc **4** is a cylindrical roller bearing washer **45** centrally located by the outside diameter of bearing **40** and in cooperation with needle roller bearing & cage **44** and the bearing washer **45** that is in contact with bearing **44** and plate **38** ,and is centrally located by spacer **46** . This configuration provides a thrust load capacity far in excess of what would normally be required .

The bearing **40** is centrally located by the coooperation of bearing shaft **41** in the center of bearing plate **38** that is located centrally atop of cross bar plate **28** . The bearing **40** is retained and preloaded by retainer **47** that is secured into place by preloading screw **48** and locked at correct preload by jam screw **32** . O-ring **39** creates a seal between disc **4** and bearing plate **38** and is centrally located by outter perimeter of the cage of bearing **44** . This O-ring **39** acts to seal in bearing **44** grease and seal out other contaminants .

Detail Description of Drawings (cont)

The floatably mounted bearing plate **38** is secured by means of 4 (more or less) screws **30** passing through plate **28** and threading into plate **38** . Four (4) (more or less) jacking screws **31** are threaded into plate **28** and contact the lower side of plate **38** in a location central to the inner diameter and outter diameter of the roller bearing **44** .

The jacking screws **31** working in cooperation with mounting screws **30** allow the tilting , in any direction about its axis , of the entire disc **4** & bearings assembly to bring the disc into exact orientation with the 45 degree angle crreated by the pins **7 , 8 , 9 , & 10** located in the vertical guide plate **5** and into perpindicularity with the moulding locating surfaces of the vertical guide plate **5** .

The cross plate **28** carrying the disc **4** and bearing assembly is mounted at its ends to riser block **35** by means of screws **16** passing through plate **28** and threaded into block **35** .

The sub-assembly of the disc **4** , V-belt **27** , bearing assembly , cross bar **28** , and riser blocks **35** are slid into the open end of base **1** and attached to the base **1** by means of screws **16** that pass through the top surface of the base **1** and thread into block **35** .

Screws **29** pass through clearance hole **36** in the lower legs of base **1** and pass through plate **28** and block **35** to thread into vertical guide plate **5** creating a rigid unit of all the critical components of the invention .

Screws **18** pass through the top surface of base**1** and thread into end caps **2 & 3** . Screws **18** pass through feet **20** and through the lower surface of base **1** and thread into end caps **2 & 3** to rigidize the sheet metal components .

Fig **11** is showing the relationship of vacuum plate **11** to the pad **6** affixed to disc **4** thus forming a small air gap between the lower surface of plate **11** and pad **6** to create a high speed air flow area created by the vacuum hose **13** attached to the circular flange on the top surface of plate **11** so as to evacuate sanding residue from the working area of the pad **6** .

Turning to Figures **12** through **16** what is shown is an essencially triangular plate (Fig **15 & 16**)

used in cooperation with vertical guide plate **5** and pins **7 , 8 , 9 & 10** of a thickness equal to or greater than the protrusion of pins **8 & 10** from their coresponding surfaces of plate **5** . Three (3) (more or less) pins **51** are pressed into holes **65** located on the same centerline with holes **52 & 57** to form a straight line . Hole **52** is used for slidability locating plate **50** on pin **7** then rotating plate **50**about pin 7 into orientation with holes **52 , 54 , 55 , 56 ,** or **62** to create a differing predetermined working angle for moulding(s) **B**of varying mitered angles that corespond to the number of sides of a frame . The plate **50** would be slid onto pins **7 & 8** so that the surface **64** would be in contact with vertical plate **5** .

Detail Description of Drawings (cont)

The moulding **B** would then be placed with its bottom surface on surface **63** of plate **50** and with its outside surface against pins **51** for correct orientation ; for example , to sand the angle of moulding **B** for an eight sided picture frame , the plate **50** would be located with hole **52** on pin **7** and hole **55** on pin **8** to form a 22 degree 30 minute miter angle . Hole **55** coresponds with the numeral **8** and its associated line on plate **50** representing an 8 sided frame .

The same plate **50** can be used on the left side of plate **5** for sanding the moulding **A** in the same 22 degree 30 minute configuration by locating hole **57** on pin **9** and hole **60** on pin **10** . Therefore , as can be seen on plate **50** , holes **52 & 58** and their coresponding numeral 5 are used for five (5) sided frames , holes **54 & 59** for six (6) sided frames , holes **56 & 61** for twelve (12) sided frames, and hole **62** for setting up to sand at 90 degrees to the disc **4** and pad **6** .